Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): ~~Switching~~ An apparatus ~~operating at a significantly higher data rate than a plurality of switching elements (SEs) which that form a switching fabric and operate at a lower data rate, said the SEs switching elements routing data from at least one a plurality of ingress source ports, which receives receiving data at said the higher data rate, to a plurality of egress destination ports, said the data being grouped in data packets having a uniform or variable plurality of digital bytes, said the switching apparatus~~ comprising:

a ~~said~~ plurality of ~~ingress~~ source ~~port~~ ports, at least one of the source ports operable ~~including means for receiving~~ to receive ~~successive~~ complete data packets successively at ~~said~~ a higher data rate and ~~for transmitting~~ to output data via a plurality of source port ~~output ports~~ outputs at ~~said~~ a lower data rate ~~to said SEs~~;

a ~~sequential array of low data rate~~ plurality of ~~SEs~~ switching elements that form a sequential switching fabric and operate at the lower data rate, at least one of the ~~SEs~~ switching elements ~~each~~ having

a plurality of switching element ~~input ports~~ inputs individually connected to each ~~said~~ of the source port ~~output port of said input source port~~ outputs

a plurality of switching element outputs

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both ~~said~~ the ~~SEs~~ switching elements and the source ~~port~~ ports ~~including means for switching~~ operating to change a given one of the source port ~~output ports~~ outputs successively from a given one of the ~~SEs~~ switching elements to ~~another~~ a next available ~~SE~~ switching element in response to a data packet event;

a plurality of destination ports, at least one of the destination ports operable to receive the complete data packets successively at the lower data rate and having

a plurality of destination port inputs individually connected to each of the switching element outputs

a plurality of destination port outputs operable to output the complete data packets at the higher data rate

both the switching elements and the destination ports operating to change a given one of the destination port inputs successively from the given one of the switching elements to the next available switching element in response to the data packet event

~~whereby~~ wherein the effective data rate from ~~said~~ the source port outputs to ~~said SEs~~ the switching element inputs and from the switching element outputs to the destination port inputs is ~~at said~~ the higher data rate and the complete data packets of variable or fixed size are transferred through a single serial link, the single serial link comprising a given one of the source ports, a given one of the switching elements and a given one of the destination ports.

Claim 2 (Currently amended): A method ~~of routing data via switching elements(SEs) from ingress source ports which receive data at a significantly higher data rate to egress destination ports, said SEs~~

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~~operating at a lower data rate, said data being grouped in data packets said method~~ comprising ~~the following steps:~~

receiving frames at inputs of a plurality of source ports at a higher data rate

~~providing~~ successively distributing complete data packets at a lower data rate on a plurality of source port outputs that form multiple parallel channels to a plurality of ~~said SEs in an array which operate at said lower data rate for receiving complete data packets from a said ingress source port and in response to header information carried by said data packet routing such packet to a selected egress destination port:~~ switching elements in response to a data packet event

receiving the complete data packets on a given one of a plurality of switching element inputs that are individually connected to the source port outputs wherein the effective throughput of data is the higher data rate from the source port outputs to the switching element inputs

transferring the complete data packets on a given one of a plurality of switching element outputs to a given one of a plurality of destination ports

successively receiving the complete data packets at the lower data rate in response to the data packet event on a given one of a plurality of destination port inputs that form multiple parallel channels wherein the plurality of destination port inputs are individually connected to the switching element outputs and the effective throughput of data is the higher data rate from the switching element outputs to the destination port inputs

outputting the complete data packets on a destination port output at the higher data rate

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~~a said source port receiving successive data packets at said high rate and sequentially transferring each received data packet at said lower rate to the next available SE whereby the effective throughput of data is at said higher rate and a~~ wherein complete data ~~packet~~ packets ~~is transmitted through~~ are routed through ~~one~~ a single serial link, the single serial link comprising a given one of the source ports, a given one of the switching elements and a given one of the destination ports.

Claim 3 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 1 ~~where~~ wherein the ratio of ~~high~~ higher to ~~low~~ lower data rates is four to one and ~~where~~ a minimum of four ~~SEs~~ switching elements per ~~ingress~~ source port is ~~provided~~ supplied.

Claim 4 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 1 ~~where~~ wherein a minimum of two ~~SEs~~ switching elements per ~~ingress~~ source port is ~~provided~~ supplied.

Claim 5 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 3 ~~where~~ wherein two additional ~~SEs~~ switching elements provide for automatic redundancy ~~said switching means being responsive~~ and the apparatus is operable to respond to ~~the failure of an existing~~ a busy or failed ~~SE~~ switching element.

Claim 6 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 5 ~~where~~ wherein two additional ~~SEs~~ switching elements provide additional bandwidth for overhead.

Claim 7 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 1 ~~where~~ wherein the number of ~~SEs~~ switching elements is proportional to the ratio of higher to lower data rates.

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Claim 8 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 7 ~~where~~ wherein the number of ~~SEs~~ switching elements is upwardly scalable to accommodate greater data input.

Claim 9 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 1 ~~where~~ wherein ~~said~~ each data packet event is ~~the end~~ defined as completing the transfer of one data packet and ~~the~~ beginning the transfer of another data packet immediately after.

Claim 10 (Currently amended): The ~~Switching~~ apparatus ~~as in~~ of claim 1 ~~where~~ wherein ~~each~~ the complete data packet is routed from at least one of the source ports to a given one of the destination ports where a payload of each data packet is ~~very large~~ much larger in comparison to ~~the number of bytes required for~~ an attached header ~~which~~ that identifies ~~such~~ the data packet and ~~along with~~ its ultimate destination ~~whereby~~ such that overhead is minimized.

Claim 11 (New): The apparatus of claim 1 wherein at least one of the source ports comprises

a communications processor coupled to the source port input and operable to process the complete data packets at the higher data rate

a traffic manager having an input coupled to the communications processor, the traffic manager further comprising

a sequential sprinkler engine operable to successively distribute the complete data packets to the switching elements at the lower data rate

control logic operable to command the sequential sprinkler engine to output the complete data packets successively on the source port outputs.

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Claim 12 (New): The apparatus of claim 11 wherein the control logic comprises

a controller operable to command the sequential sprinkler engine to successively change the distribution of a given one of the complete data packets from busy or failed switching elements to the next available switching element

a circuit operable to determine the timing of the data packet event and having an output coupled to the controller

a table of destinations operable to monitor the busy or failed switching elements and having outputs coupled to the controller and the circuit.

Claim 13 (New): The apparatus of claim 12 wherein the control logic is operable to respond to the busy or failed switching elements by commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 14 (New): The apparatus of claim 12 wherein the control logic provides automatic redundancy upon failure of a given one of the switching elements by commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 15 (New): The apparatus of claim 1 wherein at least one of the destination ports comprises

a traffic manager, the traffic manager further comprising

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a sequential sprinkler engine operable to successively receive the complete data packets from the switching elements at the lower data rate

control logic operable to command the sequential sprinkler engine to successively receive the complete data packets on the destination port inputs

a communications processor operable to output the complete data packets at the higher data rate and having an input coupled to the traffic manager and an output coupled to the destination port output.

Claim 16 (New): The apparatus of claim 15 wherein the control logic comprises

a controller operable to command the sequential sprinkler engine to change receiving paths successively from busy or failed switching elements to the next available switching element

a circuit operable to determine the timing of the data packet event and having an output coupled to the controller

a table of destinations operable to monitor the busy or failed switching elements and having outputs coupled to the controller and the circuit.

Claim 17 (New): The apparatus of claim 16 wherein the control logic is operable to respond to the busy or failed switching elements by commanding the sequential sprinkler engine to successively receive a given one of the complete data packets through the next available switching element in the sequential switching fabric.

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Claim 18 (New): The apparatus of claim 16 wherein the control logic provides automatic redundancy upon failure of a given one of the switching elements by commanding the sequential sprinkler engine to successively receive a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 19 (New): The method of claim 2 wherein successively distributing the complete data packets further comprises

determining an ultimate destination for the complete data packets through the plurality of switching elements that form a switching fabric

determining a next available switching element by monitoring busy or failed switching elements

commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 20 (New): The method of claim 2 wherein the number of switching elements is proportional to the ratio of the high to low data rates.

Claim 21 (New): The method of claim 2 wherein the number of switching elements is upwardly scalable to accommodate greater data input.

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Claim 22 (New): The method of claim 2 wherein transferring the complete data packet on one serial link minimizes overhead by avoiding the break up of each data packet into segments requiring headers.

Claim 23 (New): The method of claim 2 wherein each data packet event is defined as completing the transfer of one data packet and beginning the transfer of another data packet immediately after.

Claim 24 (New): The method of claim 19 wherein determining the next available switching element by monitoring the failed switching element and successively distributing the complete data packet to the next available switching element provides automatic redundancy.

Claim 25 (New): The method of claim 2 wherein sequentially receiving the complete data packets further comprises

receiving the complete data packets from the plurality of switching elements that form a switching fabric

determining a next available switching element by monitoring busy or failed switching elements

commanding the sequential sprinkler engine to successively receive a given one of the complete data packets from the next available switching element in the sequential switching fabric.

Claim 26 (New): The method of claim 2 wherein the number of switching elements is proportional to the ratio of the high to low data rates.

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Claim 27 (New): The method of claim 2 wherein the number of switching elements is upwardly scalable to accommodate greater data input.

Claim 28 (New): The method of claim 2 wherein transferring the complete data packet on one serial link minimizes overhead by avoiding the break up of each data packet into segments requiring headers.

Claim 29 (New): The method of claim 2 wherein each data packet event is defined as completing the transfer of one data packet and beginning the transfer of another data packet immediately after.

Claim 30 (New): The method of claim 25 wherein determining the next available switching element by monitoring the failed switching element and successively distributing the complete data packet to the next available switching element provides automatic redundancy.

Claim 31 (New): An apparatus comprising:

a plurality of source ports operable to receive frames at a higher data rate, at least one of the source ports comprising

a source port input

a plurality of source port outputs providing multiple parallel channels

wherein at least one of the source ports is operable to sequentially output complete data packets through the multiple parallel channels at a lower data rate

a plurality of switching elements forming a sequential switching fabric and operating at the lower data rate, the switching elements each comprising

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a plurality of switching element inputs individually coupled to the source port outputs

a plurality of switching element outputs

a plurality of destination ports operable to sequentially receive the complete data packets at the lower data rate and output the complete data packets at the higher data rate, at least one of the destination ports comprising

a plurality of destination port inputs individually coupled to the switching element outputs

a destination port output

wherein the complete data packets having uniform or variable size are routed through a single serial link while sustaining throughput at the higher data rate, the single serial link formed by a given one of the source ports, a given one of the switching elements and a given one of the destination ports.

Claim 32 (New): The apparatus of claim 31 wherein at least one of the source ports comprises

a communications processor coupled to the source port input and operable to process the complete data packets at the higher data rate

a traffic manager having an input coupled to the communications processor, the traffic manager further comprising

a sequential sprinkler engine operable to successively distribute the complete data packets to the switching elements at the lower data rate

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control logic operable to command the sequential sprinkler engine to output the complete data packets successively on the source port outputs.

Claim 33 (New): The apparatus of claim 32 wherein the control logic comprises

a controller operable to command the sequential sprinkler engine to successively change the output of a given one of the complete data packets from busy or failed switching elements to the next available switching element

a circuit operable to determine the timing of the data packet event and having an output coupled to the controller

a table of destinations operable to monitor the busy or failed switching elements and having outputs coupled to the controller and the circuit.

Claim 34 (New): The apparatus of claim 32 wherein the control logic is operable to respond to the busy or failed switching elements by commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 35 (New): The apparatus of claim 32 wherein the control logic provides automatic redundancy upon failure of a given one of the switching elements by commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 36 (New): The apparatus of claim 31 wherein at least one of the destination ports comprises

a traffic manager, the traffic manager further comprising

a sequential sprinkler engine operable to successively receive the complete data packets from the switching elements at the lower data rate

control logic operable to command the sequential sprinkler engine to successively receive the complete data packets on the destination port inputs

a communications processor operable to output the complete data packets at the higher data rate and having an input coupled to the traffic manager and an output coupled to the destination port output.

Claim 37 (New): The apparatus of claim 36 wherein the control logic comprises

a controller operable to command the sequential sprinkler engine to change receiving paths successively from busy or failed switching elements to the next available switching element

a circuit operable to determine the timing of the data packet event and having an output coupled to the controller

a table of destinations operable to monitor the busy or failed switching elements and having outputs coupled to the controller and the circuit.

Claim 38 (New): The apparatus of claim 37 wherein the control logic is operable to respond to the busy or failed switching elements by commanding the sequential sprinkler engine to successively receive a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 39 (New): The apparatus of claim 37 wherein the control logic provides automatic redundancy upon failure of a given one of the switching elements by commanding the sequential sprinkler engine to successively receive a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 40 (New): A method comprising:

receiving frames at an input of a plurality of source ports at a higher data rate

sequentially distributing complete data packets at a lower data rate from a plurality of source port outputs to a plurality of switching elements

receiving the complete data packets at a lower data rate on a plurality of switching element inputs

transferring the complete data packets to a plurality of destination ports

sequentially receiving the complete data packets at a lower data rate on a plurality of destination port inputs

outputting the complete data packets from a given one of the destination ports at the higher data rate

wherein the complete data packets are routed through a single serial link while sustaining throughput at the higher data rate, the single serial link formed by a given one of the source ports, a given one of the switching elements and a given one of the destination ports.

Claim 41 (New): The method of claim 40 wherein successively distributing the complete data packets further comprises

determining an ultimate destination for the complete data packets through the plurality of switching elements that form a switching fabric

determining a next available switching element by monitoring a busy or failed switching element

commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 42 (New): The method of claim 40 wherein the number of switching elements is proportional to the ratio of the high to low data rates.

Claim 43 (New): The method of claim 40 wherein the number of switching elements is upwardly scalable to accommodate greater data input.

Claim 44 (New): The method of claim 40 wherein the complete data packet transferred on one serial link minimizes overhead by avoiding the break up of each data packet into segments requiring headers.

Claim 45 (New): The method of claim 40 wherein each data packet event is defined as completing the transfer of one data packet and beginning the transfer of another data packet immediately.

Claim 46 (New): The method of claim 41 wherein determining the next available switching element by monitoring the failed switching elements and successively distributing the complete data packet to the next available switching element provides automatic redundancy.

Claim 47 (New): The method of claim 40 wherein sequentially receiving the complete data packets further comprises

receiving the complete data packets from the plurality of switching elements that form a switching fabric

determining a next available switching element by monitoring busy or failed switching elements

commanding the sequential sprinkler engine to successively receive a given one of the complete data packets from the next available switching element in the sequential switching fabric.

Claim 48 (New): The method of claim 47 wherein the number of switching elements is proportional to the ratio of the high to low data rates.

Claim 49 (New): The method of claim 47 wherein the number of switching elements is upwardly scalable to accommodate greater data input.

Claim 50 (New): The method of claim 47 wherein the complete data packet transferred on one serial link minimizes overhead by avoiding the break up of each data packet into segments requiring headers.

Claim 51 (New): The method of claim 47 wherein each data packet event is defined as completing the transfer of one data packet and beginning the transfer of another data packet immediately.

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Claim 52 (New): The method of claim 48 wherein determining the next available switching element by monitoring the failed switching elements and successively distributing the complete data packet to the next available switching element provides automatic redundancy.

Claim 53 (New): An apparatus comprising:

a plurality of source ports for sequentially distributing complete data packets to a plurality of switching elements at a lower data rate wherein some latency occurs between the complete data packets

a plurality of destination ports for sequentially receiving complete data packets from the plurality of switching elements at the lower data rate wherein some latency occurs between the complete data packets

both the source ports and destination ports operating approximately at the higher data rate

wherein the complete data packets are routed through a single serial link at a data packet event while sustaining throughput from the source ports to the switching elements and the switching elements to the destination ports at the higher data rate.

Claim 54 (New): The apparatus of claim 53 wherein at least one of the source ports comprises

a communications processor operable to process the complete data packets at the higher data rate

a traffic manager having an input coupled to the communications processor, the traffic manager further comprising

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a sequential sprinkler engine operable to successively distribute the complete data packets to the switching elements at the lower data rate

control logic operable to command the sequential sprinkler engine to output the complete data packets successively.

Claim 55 (New): The apparatus of claim 54 wherein the control logic comprises

a controller operable to command the sequential sprinkler engine to successively change the output of a given one of the complete data packets from busy or failed switching elements to a next available switching element

a circuit operable to determine the timing of the data packet event and having an output coupled to the controller

a table of destinations operable to monitor the busy or failed switching elements and having outputs coupled to the controller and the circuit.

Claim 56 (New): The apparatus of claim 55 wherein the control logic is operable to respond to the busy or failed switching elements by commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 57 (New): The apparatus of claim 55 wherein the control logic provides automatic redundancy upon failure of a given one of the switching elements by commanding the sequential sprinkler engine

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to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 58 (New): The apparatus of claim 53 wherein at least one of the destination ports comprises

a traffic manager, the traffic manager further comprising

a sequential sprinkler engine operable to successively receive the complete data packets from the switching elements at the lower data rate

control logic operable to command the sequential sprinkler engine to successively receive the complete data packets

a communications processor operable to output the complete data packets at the higher data rate and having an input coupled to the traffic manager.

Claim 59 (New): The apparatus of claim 58 wherein the control logic comprises

a controller operable to command the sequential sprinkler engine to change receiving paths successively from busy or failed switching elements to a next available switching element

a circuit operable to determine the timing of the data packet event and having an output coupled to the controller

a table of destinations operable to monitor the busy or failed switching elements and having outputs coupled to the controller and the circuit.

Claim 60 (New): The apparatus of claim 59 wherein the control logic is operable to respond to the busy or failed switching elements by commanding the sequential sprinkler engine to successively

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receive a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 61 (New): The apparatus of claim 59 wherein the control logic provides automatic redundancy upon failure of a given one of the switching elements by commanding the sequential sprinkler engine to successively receive a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 62 (New): A method comprising:

sequentially distributing complete data packets from a plurality of source ports to a plurality of switching elements at a lower data rate wherein some latency occurs between the complete data packets

sequentially receiving complete data packets from the switching elements to a plurality of destination ports at the lower data rate wherein some latency occurs between the complete data packets

both the source ports and destination ports operating approximately at the higher data rate

wherein the complete data packets are routed through a single serial link at a data packet event while sustaining throughput from the source ports to the switching elements and the switching elements to the destination ports at the higher data rate.

Claim 63 (New): The method of claim 62 wherein successively distributing the complete data packets further comprises

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determining an ultimate destination for the complete data packets through the plurality of switching elements that form a switching fabric

determining a next available switching element by monitoring busy or failed switching elements

commanding the sequential sprinkler engine to successively distribute a given one of the complete data packets through the next available switching element in the sequential switching fabric.

Claim 64 (New): The method of claim 62 wherein the number of switching elements is proportional to the ratio of the high to low data rates.

Claim 65 (New): The method of claim 62 wherein the number of switching elements is upwardly scalable to accommodate greater data input.

Claim 66 (New): The method of claim 62 wherein the complete data packet transferred on one serial link minimizes overhead by avoiding the break up of each data packet into segments requiring headers.

Claim 67 (New): The method of claim 62 wherein each data packet event is defined as completing the transfer of one data packet and beginning the transfer of another data packet immediately.

Claim 68 (New): The method of claim 63 wherein determining the next available switching element by monitoring the failed switching elements and successively distributing the complete data packet to the next available switching element provides automatic redundancy.

Claim 69 (New): The method of claim 62 wherein sequentially receiving the complete data packets further comprises

receiving the complete data packets from the plurality of switching elements that form a switching fabric

determining a next available switching element by monitoring busy or failed switching elements

commanding the sequential sprinkler engine to successively receive a given one of the complete data packets from the next available switching element in the sequential switching fabric.

Claim 70 (New): The method of claim 69 wherein the number of switching elements is proportional to the ratio of the high to low data rates.

Claim 71 (New): The method of claim 69 wherein the number of switching elements is upwardly scalable to accommodate greater data input.

Claim 72 (New): The method of claim 69 wherein the complete data packet transferred on one serial link minimizes overhead by avoiding the break up of each data packet into segments requiring headers.

Claim 73 (New): The method of claim 69 wherein each data packet event is defined as completing the transfer of one data packet and beginning the transfer of another data packet immediately.

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Claim 74 (New): The method of claim 70 wherein determining the next available switching element by monitoring the failed switching elements and successively distributing the complete data packet to the next available switching element provides automatic redundancy.

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